TWR-17272 Vol. VIII

Flight Set 360L001 STS-26
Systems Tunnel Component Final Report
Volume VIII
Final Release

14 April 1989

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ABSTRACT

Volume VIII deals with the systems tunnel component of the RSRM-1 flight set. Postflight inspections of the floor plate and splice plates, the thermal protection system and the bondlines are discussed. All observations were as expected, with no problems seen.

ACRONYMS

EPDM	Ethylene Propylene Diene Monomer
KSC	Kennedy Space Center
PEEP	Postflight Engineering Evaluation Plan
RSRM	Redesigned Solid Rocket Motor
STS	Space Transportation System
TPS	Thermal Protection System
USBI	United Space Boosters, Inc.

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1.0 INTRODUCTION

STS-26 was launched from KSC pad 39B on 29 September 1988. Two of the RSRMs were part of the launch system and are designated by RSRM-1A (360L001A) and RSRM-1B (360L001B). Both motors incorporated the aluminum floor plate systems tunnel as shown in Figure 1. Following booster separation and splashdown, the motors were recovered and returned to Cape Canaveral Hangar AF for disassembly and inspection.

In an attempt to standardize and document the evaluation of flight RSRM's, a PEEP has been written (Reference 1). The PEEP outlines the basic evaluations to be performed at Hangar AF. Appropriate procedures contained in this plan were used to evaluate the systems tunnel component. The intent of these procedures is to insure that all pertinent evaluation points are examined and documented in a consistent and complete manner.

2.0 OBJECTIVE

The objective of this report is to document the postflight condition of the systems tunnel components used on RSRM-1A and RSRM-1B.

3.0 SUMMARY

The TPS coated covers were observed to be intact and undented during open assessment. Small areas of paint blistering and TPS pock marks were observed. Sooting was seen on the TPS surface, but not in the pock marks, indicating damage due to splashdown. Following open assessment, hydrolaze removal of the systems tunnel TPS was performed. Inspection of the Morton Thiokol components and bondlines followed decabling. No loose, missing or damaged components were seen. The shear ply to case and shear ply to aluminum floor plate bondlines appeared perfect.

4.0 CONCLUSION

Insulation and Component Design found no reportable conditions and concluded the RSRM-1A and RSRM-1B systems tunnel components performed as designed.

5.0 RECOMMENDATION

Insulation and Component Design recommend that the systems tunnel component continue to be inspected postflight to verify performance as designed.

6.0 DISCUSSION

The first inspection (visual) of the RSRM-1A and RSRM-1B systems tunnels was performed during open assessment, immediately following removal from the water, safing of the linear shaped charge and prior to hydrolazing. The inspection of the tunnel covers is performed to find potential damage to Morton Thiokol's underlying components. The system tunnel covers and TPS coverings are the responsibility of United Space Boosters Inc. The system tunnel covers were intact and undented. Small areas of paint thermal-blistering and TPS pockmarks were noted on the bondline cork insulation, typically less than an inch in diameter. The pock marks were shallow, typically less than 0.1 inch deep, and attributed to nozzle severance and splash-down debris. No sooting or heat effect was evident within the pocks.

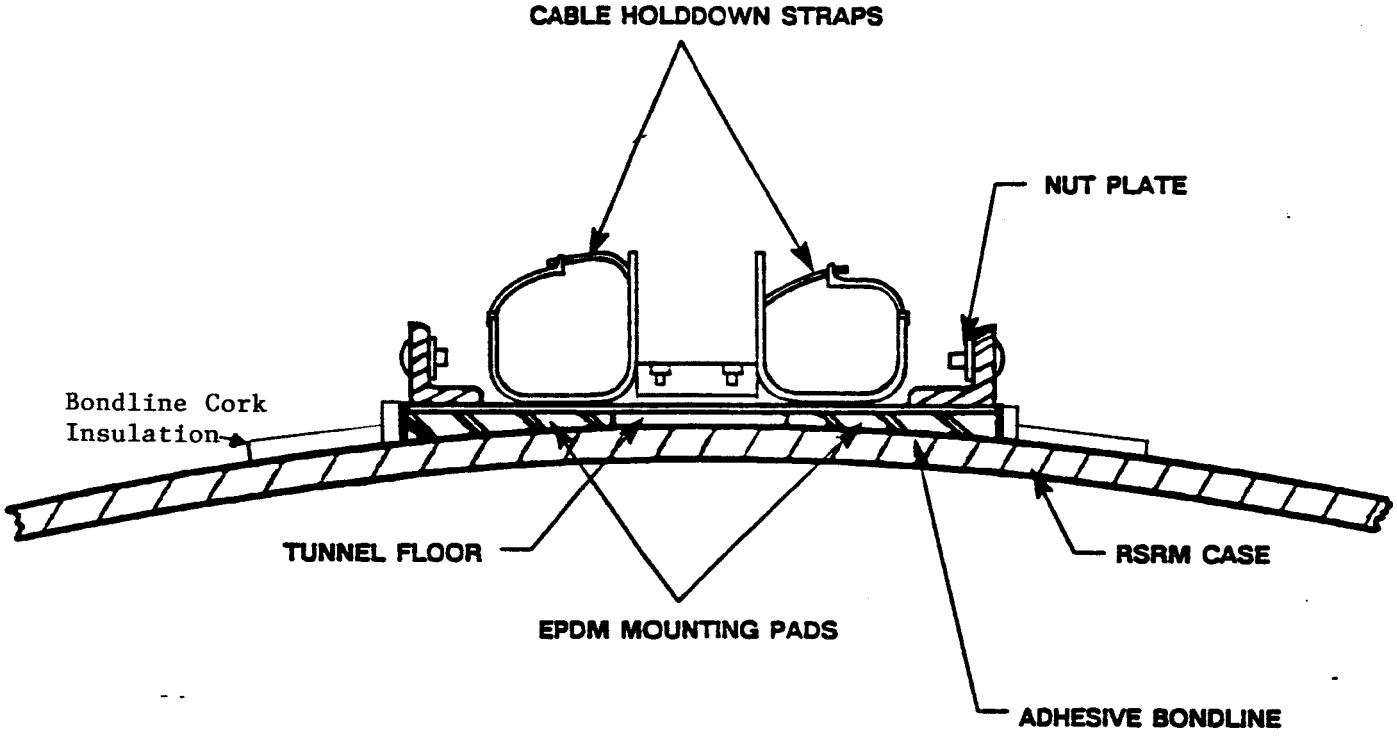
Following open assessment, the boosters were moved into the hydrolazing bay to remove bondline insulation (cork, STW4-2700) and the tunnel cover TPS (K5NA (STW5-3183) and a USBI ablative material). Cover removal and decabling followed. The exposed floor plates, splice plates and bondlines were then inspected. The plates and associated structures were all intact, undamaged and firmly held in place. The shear ply to case and shear ply to aluminum floor plate bondlines were visually inspected and probed with a steel rule every 6 to 12 inches on both sides of the systems tunnel. No unbonds or bondline voids were detected.

In addition to the postflight assessments, a pull test was performed on some of the system tunnel floor plates at the Clearfield H-7 facility to develop new proof test loadings (See Reference 2).

REFERENCES

1. TWR-16475 Vol. VIII Book 1, 'KSC Postflight Engineering Evaluation Plan (Systems Tunnel Component)', S. Olsen and J. Bailey, 1 September 1988.

2. TWR-18865, 'STS-26 Postflight Systems Tunnel Aluminum Floor Plate Pull Test Report', M. Perry and B. Traveller, January 1989.



Systems Tunnel Cross Section

Figure 1

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